

Remarks

Re-examination and reconsideration of the rejections are hereby requested.

The present invention is a receiver for processing multi-signature signals having undergone some distortion such as by the addition of noise. The receiver of the invention mitigates both the effects of multi-user interference and white noise while requiring knowledge of only the signature signals. As explained in the specification, prior art optimal and minimum mean-squared error receivers require knowledge of channel parameters, in particular, the noise level and received amplitudes of the users' signals. The optimal receiver is also non-linear and requires knowledge of the probability density function of the noise, making it very complicated to implement.

Matched filter and decorrelator receivers, also known in the prior art, require knowledge only of signature signals. Although matched filter receivers compensate optimally for white noise they do not exploit the structure of multi-user interference. Conversely, the correlator receivers optimally reject the multi-user interference but do not account for white noise.

According to one aspect, the receiver of the invention includes a bank of correlators for receiving a signal that is a linear combination of a set of signature signals that has undergone some distortion. A correlation shaper then operates on a vector output from the bank of correlators. The bank of correlators may comprise a decorrelator receiver or a matched filter receiver and the correlation shaper may be a whitening transformation.

An embodiment of the present invention is shown in Fig. 1. As shown, a signal 20 that is a linear combination of a set of signature signals and a noise component is received and processed by a bank of correlators 30. The received signal is cross correlated with signals 90 so that a vector output is produced. The vector output is then shaped by a correlation shaper 50 and the vector output 60 of the correlation shaper 50 is optionally passed to a detector 70.

Claims 1, 2, 14-27 and 13-48 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Smee, *et al.*, U.S. Patent No. 6,522,683. The Examiner asserts that the transmit FIR filter 230 in Fig. 2 of Smee is a correlation shaper. This finite-duration impulse response filter 230 is not a correlation shaper. The Examiner's attention is directed to Smee at column 9, line 51 that states that element 230 is "used for pulse shaping signals prior to their transmission over a communication channel." Pulse shaping is not the correlation shaping recited in the claims of the present invention. It is therefore submitted that claims 1,2, 14-27 and 37-48 are not anticipated by Smee, *et al.*.

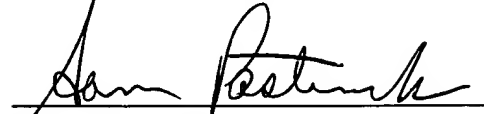
Claim 3 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Smee, *et al.* above in view of applicant's disclosed prior art, specifically prior art discussed in paragraph 0004. Claim 3 depends from claim 1 which is allowable as argued above.

Claims 4-6, 9-11, 27-30, 33 and 34 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Smee, *et al.* in view of Huang, *et al.*, U.S. Patent No. 6,067,292. The Examiner states that Smee does not disclose shaping the correlation by minimizing the mean-square error and cites Huang to meet that limitation stating that minimizing the mean square error takes place in a correlation shaper. The pilot cancellation scheme illustrated in Fig. 6 of Huang is not a correlation shaper and thus neither Smee nor Huang disclose a correlation shaper. Reconsideration is requested.

Finally, claims 7, 8, 12, 13, 31, 32, 35 and 36 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Smee, *et al.* in view of Heikkila, U.S. Published Application 2002/0122470. The Examiner refers to Fig. 8 and to paragraph 0106. The Examiner states that the output of conversion block 46 is input to element 30. The block 46 is merely an analog demodulator that demodulates an RF signal to baseband and processes as needed to form a baseband signal. Further, these claims depend from independent claims that are allowable for the reasons discussed above. Reconsideration is requested.

For the foregoing reasons it is submitted that the pending claims are in condition for allowance and early favorable action is requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Sam Pasternack", written over a horizontal line.

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